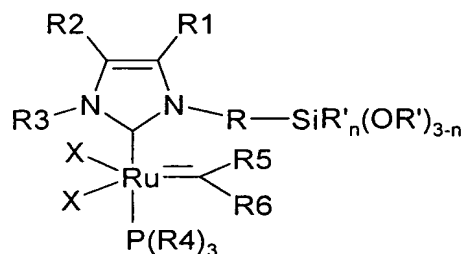


# PATENT CLAIMS

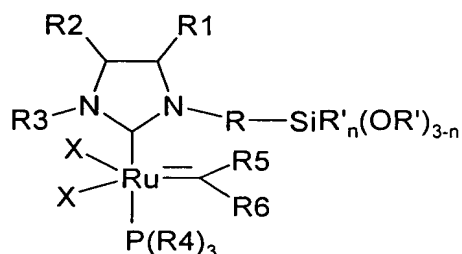
1. Compounds of the general formulae (I) and (II)

5



10

(I)



(II)

in which

15

R is A, Ar, A-Ar, A-Ar-A, Het, AHet or AHetA having a total of not more than 30 carbon atoms, where

A is a straight-chain, branched or saturated C<sub>1</sub>-C<sub>20</sub>-alkyl radical, cycloalkyl or cycloalkyl bonded via one or two alkyl group(s) having a total of 4 – 30 carbon atoms, where one CH<sub>2</sub> or CH group both in the alkyl radical and in the cycloalkyl radical may be replaced by N, NH, NA, O and/or S, and H atoms may be replaced by OA, NA<sub>2</sub> and/or PA<sub>2</sub>,

20

Ar is mono- or polysubstituted or unsubstituted phenyl, naphthyl, anthryl or phenanthryl having a total of not more than 20 carbon atoms, where substituents may be A, Hal, OA, NA<sub>2</sub>, PA<sub>2</sub>, COOA, COA, CN, CONHA, NO<sub>2</sub>, =NH or =O,

25

Het is a monocyclic or bicyclic, saturated or unsaturated or aromatic heterocyclic radical having from 1 to 4 N, O and/or S atoms, which may be unsubstituted or mono-, di- or trisubstituted by Hal and/or A, OA, COOA, COA, CN, CONHA, NA<sub>2</sub>, PA<sub>2</sub>, NO<sub>2</sub>, =NH or =O, where

30

Hal is F, Cl, Br or I,

R', independently of the position in the molecule, is A or Ar having 1 – 12 carbon atoms,

35

R3 is A, Ar, AAr, AArA, Het, AHet or AHetA having 6 – 18 carbon atoms, in which the radical A which is not bonded to Ar or Het is an

- alkyl or cycloalkyl which is unsubstituted or substituted by one or more groups Z, and Ar is an aromatic hydrocarbon which is unsubstituted or mono- or polysubstituted by a group Z, and Het is a saturated, unsaturated or aromatic heterocyclic radical, which may be mono- or polysubstituted by a group Z, and
- R1 and R2, independently of one another, are H, Z, Hal or A, Ar, AAr, Het or AHet having 1 – 18 carbon atoms, in which the radical A which is not bonded to Ar or Het is alkyl or cycloalkyl which is unsubstituted or substituted by one or more groups Z, and Ar is an aromatic hydrocarbon which is unsubstituted or mono- or polysubstituted by a group Z,
- R4 is A, Ar or AAr having 1 – 30 carbon atoms,
- R5 and R6, independently of one another, are H, A or Ar, where H atoms in A or Ar may be substituted by alkenyl or alkynyl radicals, having not more than 30 carbon atoms, where
- Hal is F, Cl, Br or I,
- Z, independently of the position in R1, R2 and R3, are functional groups containing N, P, O or S atoms, or A or Ar, and
- X are anionic ligands which are identical to or different from one another and which each form a ligand bond to Ru, and
- n is 0, 1 or 2.
2. Compounds according to Claim 1 of the general formulae (I) and (II) in which
- R is A, Ar, A-Ar, A-Ar-A, Het, AHet or AHetA having a total of not more than 20 carbon atoms,
- R', independently of the position in the molecule, is a straight-chain, branched, saturated, mono- or polyunsaturated C<sub>1</sub>-C<sub>7</sub>-alkyl radical,
- R3 is A, Ar, AAr, AArA, Het, AHet or AHetA having 1 – 18 carbon atoms, in which the radical A which is not bonded to Ar or Het is alkyl or cycloalkyl which is unsubstituted or substituted by one or more groups Z, and Ar is an aromatic hydrocarbon which is unsubstituted or mono- or polysubstituted by a group Z, and Het is a saturated, unsaturated or aromatic heterocyclic radical, which may be mono- or polysubstituted by a group Z, and

R1 and R2, independently of one another, are H, Hal or a straight-chain, branched, saturated, mono- or polyunsaturated C<sub>1</sub>-C<sub>7</sub>-alkyl radical,

R4 is A or Ar having up to 10 carbon atoms,

R5 and R6, independently of one another, are H, alkyl, cycloalkyl, aryl, alkenyl or alkynyl having up to 30 carbon atoms,

Hal is Cl or Br,

X is Br<sup>-</sup>, Cl<sup>-</sup>, I<sup>-</sup> or F<sup>-</sup>, cyanide (CN<sup>-</sup>), thiocyanide (SCN<sup>-</sup>), alkoxide, aryl oxide, alkyl, aryl or carboxyl,

Z is A

and

n is 0,

and A, Ar and Het are as defined in Claim 1.

3. Compounds according to Claim 1 of the general formulae (I) and (II) in which

R is A, Ar, A-Ar or A-Ar-A having a total of not more than 20 carbon atoms, where

A is a straight-chain or branched, saturated C<sub>1</sub>-C<sub>12</sub>-alkyl radical, cycloalkyl having 3 – 10 carbon atoms or C<sub>4</sub>-C<sub>20</sub>-cycloalkyl which is bonded via one or two alkyl group(s),

Ar is mono- or polysubstituted or unsubstituted phenyl, where substituents can adopt the meanings of A, and R has a total of not more than 20 carbon atoms,

R', independently of the position in the molecule, is a straight-chain or branched, saturated C<sub>1</sub>-C<sub>7</sub>-alkyl radical,

R3 is A with the meaning of a straight-chain, unbranched (linear), branched, saturated, mono- or polyunsaturated or cyclic saturated, mono- or polyunsaturated hydrocarbon radical having 1 – 18 carbon atoms or of an aromatic hydrocarbon radical having from 6 to 18 carbon atoms which is unsubstituted or substituted by Z = A,

R1 and R2, independently of one another, are H, Cl, Br, or a straight-chain, branched, saturated, mono- or polyunsaturated C<sub>1</sub>-C<sub>7</sub>-alkyl radical,

R4 is C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>5</sub>-C<sub>8</sub>-cycloalkyl or C<sub>6</sub>-C<sub>10</sub>-aryl,

R5 and R6 are C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>5</sub>-C<sub>8</sub>-cycloalkyl or C<sub>6</sub>-C<sub>10</sub>-aryl,

X is Cl or Br,

Z is A and  
 n is 0,  
 and A and Ar are as defined in Claim 1.

- 5        4. Compounds according to Claim 1 of the general formulae (I) and (II)  
 in which
- R is C<sub>1</sub>-C<sub>12</sub>-alkylene, C<sub>3</sub>-C<sub>10</sub>-cycloalkylene, or C<sub>4</sub>-C<sub>20</sub>-cycloalkylene,  
 C<sub>6</sub>-C<sub>14</sub>-arylene or C<sub>7</sub>-C<sub>20</sub>-alkylarylene which is bonded via one or  
 two alkyl group(s),
- 10        R' is methyl, ethyl, propyl, i-propyl, butyl, i-butyl, sec-butyl, tert-butyl,  
 pentyl, 1-, 2- or 3-methylbutyl (-C<sub>5</sub>H<sub>10</sub>-), 1,1-, 1,2- or 2,2-dimethyl-  
 propyl (-C<sub>5</sub>H<sub>10</sub>-), 1-ethylpropyl (-C<sub>5</sub>H<sub>10</sub>-), hexyl (-C<sub>6</sub>H<sub>12</sub>-), 1-, 2-, 3- or  
 4-methylpentyl (-C<sub>6</sub>H<sub>12</sub>-), 1,1-, 1,2-, 1,3-, 2,2-, 2,3- or 3,3-dimethyl-  
 butyl (-C<sub>6</sub>H<sub>12</sub>-), 1- or 2-ethylbutyl (-C<sub>6</sub>H<sub>12</sub>-), 1-ethyl-1-methylpropyl  
 15        (-C<sub>6</sub>H<sub>12</sub>-), 1-ethyl-2-methylpropyl (-C<sub>6</sub>H<sub>12</sub>-), 1,1,2- or 1,2,2-trimethyl-  
 propyl (-C<sub>6</sub>H<sub>12</sub>-), heptyl, octyl, nonyl, decyl, undecyl, dodecyl, vinyl,  
 propenyl, 1,2-propadienyl, butenyl, butadienyl, pentenyl, 1,2-, 1,4-  
 or 1,3-pentadienyl, 2,3-dimethyl-2-butenyl, hexenyl, 1,5-hexadienyl,  
 2-methyl-1,3-butadienyl, 2,3-dimethyl-1,3-butadienyl, isopentenyl,  
 20        cyclopropenyl, cyclobutenyl, cyclopentenyl, cyclopentadienyl,  
 methylcyclopentadienyl, ethynyl, 1,2-propynyl, 2-butylnyl, 1,3-buta-  
 diynyl, pentynyl or hexynyl,
- R3 is phenyl, tolyl, 2,6-dimethylphenyl, mesityl, 2,6-diisopropylphenyl,  
 2,4,6-triisopropylphenyl or cyclohexyl,
- 25        R1 and R2 are SO<sub>3</sub>H, F, Cl, hydroxyl, alkanoyl or cycloalkanoyl,
- R4 is methyl, ethyl, propyl, i-propyl, butyl, i-butyl, sec-butyl, tert-butyl,  
 pentyl, 1-, 2- or 3-methylbutyl (-C<sub>5</sub>H<sub>10</sub>-), 1,1-, 1,2- or 2,2-dimethyl-  
 propyl (-C<sub>5</sub>H<sub>10</sub>-), 1-ethylpropyl (-C<sub>5</sub>H<sub>10</sub>-), hexyl (-C<sub>6</sub>H<sub>12</sub>-), 1-, 2-, 3- or  
 4-methylpentyl (-C<sub>6</sub>H<sub>12</sub>-), 1,1-, 1,2-, 1,3-, 2,2-, 2,3- or 3,3-dimethyl-  
 butyl (-C<sub>6</sub>H<sub>12</sub>-), 1- or 2-ethylbutyl (-C<sub>6</sub>H<sub>12</sub>-), 1-ethyl-1-methylpropyl  
 30        (-C<sub>6</sub>H<sub>12</sub>-), 1-ethyl-2-methylpropyl (-C<sub>6</sub>H<sub>12</sub>-), 1,1,2- or 1,2,2-trimethyl-  
 propyl (-C<sub>6</sub>H<sub>12</sub>-), cyclopentyl, cyclohexyl, methylcyclopentyl, cyclo-  
 heptyl, methylcyclohexyl, cyclooctyl, phenyl, o-, m- or p-tolyl, o-, m-  
 or p-ethylphenyl, o-, m- or p-propylphenyl, o-, m- or p-isopropyl-  
 35        phenyl, o-, m- or p-tert-butylphenyl or naphthyl,

R5 and R6 are methyl, ethyl, propyl, i-propyl, butyl, i-butyl, sec-butyl, tert-butyl, pentyl, 1-, 2- or 3-methylbutyl ( $-C_5H_{10}-$ ), 1,1-, 1,2- or 2,2-dimethylpropyl ( $-C_5H_{10}-$ ), 1-ethylpropyl ( $-C_5H_{10}-$ ), hexyl ( $-C_6H_{12}-$ ), 1-, 2-, 3- or 4-methylpentyl ( $-C_6H_{12}-$ ), 1,1-, 1,2-, 1,3-, 2,2-, 2,3- or 3,3-dimethylbutyl ( $-C_6H_{12}-$ ), 1- or 2-ethylbutyl ( $-C_6H_{12}-$ ), 1-ethyl-1-methylpropyl ( $-C_6H_{12}-$ ), 1-ethyl-2-methylpropyl ( $-C_6H_{12}-$ ), 1,1,2- or 1,2,2-trimethylpropyl ( $-C_6H_{12}-$ ), heptyl, octyl, nonyl, decyl, cyclopropenyl, cyclobutenyl, cyclopentenyl, cyclohexenyl, cyclopentadienyl and methylcyclopentadienyl, phenyl, o-, m- or p-tolyl, o-, m- or p-ethylphenyl, o-, m- or p-propylphenyl, o-, m- or p-isopropylphenyl, o-, m- or p-tert-butylphenyl, naphthyl, vinyl, propenyl, butenyl, pentenyl or hexenyl, ethynyl, propynyl, butynyl, pentynyl or hexynyl,

where X, Z and n can adopt the meanings given in Claim 1.

5. Compounds according to Claim 1 of the general formulae (I) and (II) in which

R is methylene, ethylene, propylene, butylene,  $-C_6H_4-$ ,  $-C_6H_2Me_2-$ ,  $-CH_2C_6H_4-$ ,  $-CH_2C_6H_2Me_2-$ ,  $-CH_2C_6H_4CH_2-$  or  $-CH_2C_6H_2Me_2CH_2-$ ,

R' is methyl, ethyl, propyl, i-propyl, butyl, i-butyl, sec-butyl or tert-butyl,

R<sup>3</sup> is phenyl, tolyl, 2,6-dimethylphenyl, mesityl, 2,6-diisopropylphenyl, 2,4,6-triisopropylphenyl or cyclohexyl,

R1 and R2, independently of one another, are H, methoxy, ethoxy, propionyl, butyryl, pentanoyl, hexanoyl, heptanoyl, octanoyl, nonanoyl, decanoyl, undecanoyl, dodecanoyl, tridecanoyl, tetradecanoyl, pentadecanoyl, hexadecanoyl, heptadecanoyl or octadecanoyl,

R4 is cyclohexyl, cyclopentyl, isopropyl or phenyl,

R5 and R6 are H, methyl, phenyl, vinyl,  $-C=CMe_2$  or  $-C=CPh_2$ ,

X is Cl or Br,

Z is A and

n is 0.

6. Compounds according to Claim 1 of the general formulae (I) and (II) in which

R is methyl, ethyl, propyl, butyl or 2,4-dimethyl,

R' is ethyl or methyl,

R3 is methyl, i-propyl, t-butyl, mesityl, phenyl, cyclohexyl, 2,4-(di-i-propyl)phenyl or 2,4-dimethylphenyl,

R1 and R2 are H,

5 R4 is cyclohexyl or phenyl,

R5 and R6 are phenyl, cyclohexyl or  $-C=C(CH_3)_2$ ,

X is Cl or Br, and

n is 0.

- 10 7. {1-[3-(Triethoxysilyl)ethyl]-3-[2,4-(di-i-propyl)phenyl]imidazol-2-ylidene}-  
[P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
{1-[3-(trimethoxysilyl)ethyl]-3-[2,4-(di-i-propyl)phenyl]imidazol-2-ylidene}-  
[P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
{1-[3-(triethoxysilyl)propyl]-3-[2,4-(di-i-propyl)phenyl]imidazol-2-ylidene}-  
15 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
{1-[3-(trimethoxysilyl)propyl]-3-[2,4-(di-i-propyl)phenyl]imidazol-2-ylidene}-  
[P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
{1-[3-(triethoxysilyl)butyl]-3-[2,4-(di-i-propyl)phenyl]imidazol-2-ylidene}-  
[P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
20 {1-[3-(trimethoxysilyl)butyl]-3-[2,4-(di-i-propyl)phenyl]imidazol-2-ylidene}-  
[P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
{1-[3-(triethoxysilyl)ethyl]-3-(mesityl)imidazol-2-ylidene}-  
[P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
{1-[3-(trimethoxysilyl)ethyl]-3-(mesityl)imidazol-2-ylidene}-  
25 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
{1-[3-(triethoxysilyl)propyl]-3-(mesityl)imidazol-2-ylidene}-  
[P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
{1-[3-(trimethoxysilyl)propyl]-3-(mesityl)imidazol-2-ylidene}-  
[P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
30 {1-[3-(triethoxysilyl)butyl]-3-(mesityl)imidazol-2-ylidene}-  
[P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
{1-[3-(trimethoxysilyl)butyl]-3-(mesityl)imidazol-2-ylidene}-  
[P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
{1-[3-(triethoxysilyl)ethyl]-3-(phenyl)imidazol-2-ylidene}-  
35 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh

- {1-[3-(trimethoxysilyl)ethyl]-3-(phenyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)propyl]-3-(phenyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 5 {1-[3-(trimethoxysilyl)propyl]-3-(phenyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)butyl]-3-(phenyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)butyl]-3-(phenyl)imidazol-2-ylidene}-  
 10 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)ethyl]-3-(cyclohexyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)ethyl]-3-(cyclohexyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 15 {1-[3-(triethoxysilyl)propyl]-3-(cyclohexyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)propyl]-3-(cyclohexyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)butyl]-3-(cyclohexyl)imidazol-2-ylidene}-  
 20 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)butyl]-3-(cyclohexyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)ethyl]-3-(t-butyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 25 {1-[3-(trimethoxysilyl)ethyl]-3-(t-butyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)propyl]-3-(t-butyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)propyl]-3-(t-butyl)imidazol-2-ylidene}-  
 30 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)butyl]-3-(t-butyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)butyl]-3-(t-butyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 35 {1-[3-(triethoxysilyl)ethyl]-3-(i-propyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh

- {1-[3-(trimethoxysilyl)ethyl]-3-(i-propyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)propyl]-3-(i-propyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 5 {1-[3-(trimethoxysilyl)propyl]-3-(i-propyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)butyl]-3-(i-propyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)butyl]-3-(i-propyl)imidazol-2-ylidene}-  
 10 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)ethyl]-3-(methyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)ethyl]-3-(methyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 15 {1-[3-(triethoxysilyl)propyl]-3-(methyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)propyl]-3-(methyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)butyl]-3-(methyl)imidazol-2-ylidene}-  
 20 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)butyl]-3-(methyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(trimethoxysilyl)benzyl]-3-(mesityl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 25 {1-[4-(triethoxysilyl)benzyl]-3-(mesityl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(trimethoxysilyl)benzyl]-3-(cyclohexyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(triethoxysilyl)benzyl]-3-(cyclohexyl)imidazol-2-ylidene}-  
 30 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(trimethoxysilyl)benzyl]-3-(methyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(triethoxysilyl)benzyl]-3-(methyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 35 {1-[4-(trimethoxysilyl)benzyl]-3-(phenyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh



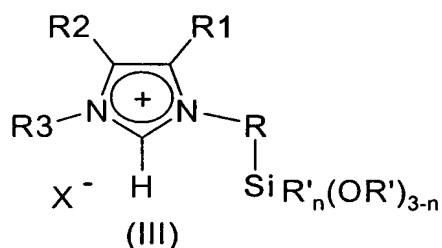
- {1-[4-(triethoxysilyl)benzyl]-3-(phenyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(trimethoxysilyl)benzyl]-3-(i-propyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 5 {1-[4-(triethoxysilyl)benzyl]-3-(i-propyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(trimethoxysilyl)benzyl]-3-(t-butyl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(triethoxysilyl)benzyl]-3-(t-butyl)imidazol-2-ylidene}-  
 10 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(trimethoxysilyl)benzyl]-3-[2,4-(di-i-propyl)phenyl]imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(triethoxysilyl)benzyl]-3-[2,4-(di-i-propyl)phenyl]imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 15 {1-[4-(trimethoxysilyl)-2,4-(dimethyl)phenyl]-3-(mesityl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(triethoxysilyl)-2,4-(dimethyl)phenyl]-3-(mesityl)imidazol-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(trimethoxysilyl)-2,4-(dimethyl)phenyl]-3-(cyclohexyl)imidazol-2-  
 20 ylidene}[P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(triethoxysilyl)-2,4-(dimethyl)phenyl]-3-(cyclohexyl)imidazol-2-  
 ylidene}[P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 as well as  
 {1-[3-(triethoxysilyl)ethyl]-3-[2,4-(di-i-propyl)phenyl]imidazolin-2-ylidene}-  
 25 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)ethyl]-3-[2,4-(di-i-propyl)phenyl]imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)propyl]-3-[2,4-(di-i-propyl)phenyl]imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 30 {1-[3-(trimethoxysilyl)propyl]-3-[2,4-(di-i-propyl)phenyl]imidazolin-2-  
 ylidene}[P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)butyl]-3-[2,4-(di-i-propyl)phenyl]imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)butyl]-3-[2,4-(di-i-propyl)phenyl]imidazolin-2-ylidene}-  
 35 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh

- {1-[3-(triethoxysilyl)ethyl]-3-(mesityl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)ethyl]-3-(mesityl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 5 {1-[3-(triethoxysilyl)propyl]-3-(mesityl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)propyl]-3-(mesityl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 10 {1-[3-(triethoxysilyl)butyl]-3-(mesityl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)butyl]-3-(mesityl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)ethyl]-3-(phenyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 15 {1-[3-(trimethoxysilyl)ethyl]-3-(phenyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)propyl]-3-(phenyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)propyl]-3-(phenyl)imidazolin-2-ylidene}-  
 20 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)butyl]-3-(phenyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)butyl]-3-(phenyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 25 {1-[3-(triethoxysilyl)ethyl]-3-(cyclohexyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)ethyl]-3-(cyclohexyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)propyl]-3-(cyclohexyl)imidazolin-2-ylidene}-  
 30 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)propyl]-3-(cyclohexyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)butyl]-3-(cyclohexyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 35 {1-[3-(trimethoxysilyl)butyl]-3-(cyclohexyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh

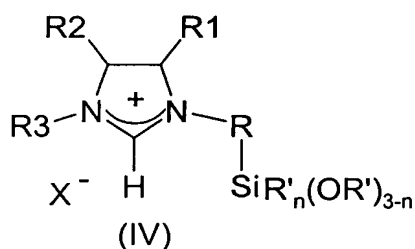
- {1-[3-(triethoxysilyl)ethyl]-3-(t-butyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)ethyl]-3-(t-butyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 5 {1-[3-(triethoxysilyl)propyl]-3-(t-butyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)propyl]-3-(t-butyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)butyl]-3-(t-butyl)imidazolin-2-ylidene}-  
 10 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)butyl]-3-(t-butyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)ethyl]-3-(i-propyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 15 {1-[3-(trimethoxysilyl)ethyl]-3-(i-propyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)propyl]-3-(i-propyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)propyl]-3-(i-propyl)imidazolin-2-ylidene}-  
 20 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)butyl]-3-(i-propyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)butyl]-3-(i-propyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 25 {1-[3-(triethoxysilyl)ethyl]-3-(methyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)ethyl]-3-(methyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)propyl]-3-(methyl)imidazolin-2-ylidene}-  
 30 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(trimethoxysilyl)propyl]-3-(methyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[3-(triethoxysilyl)butyl]-3-(methyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 35 {1-[3-(trimethoxysilyl)butyl]-3-(methyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh

- {1-[4-(trimethoxysilyl)benzyl]-3-(mesityl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(triethoxysilyl)benzyl]-3-(mesityl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 5 {1-[4-(trimethoxysilyl)benzyl]-3-(cyclohexyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(triethoxysilyl)benzyl]-3-(cyclohexyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 10 {1-[4-(trimethoxysilyl)benzyl]-3-(methyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(triethoxysilyl)benzyl]-3-(methyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(trimethoxysilyl)benzyl]-3-(phenyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 15 {1-[4-(triethoxysilyl)benzyl]-3-(phenyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(trimethoxysilyl)benzyl]-3-(i-propyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(triethoxysilyl)benzyl]-3-(i-propyl)imidazolin-2-ylidene}-  
 20 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(trimethoxysilyl)benzyl]-3-(t-butyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(triethoxysilyl)benzyl]-3-(t-butyl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 25 {1-[4-(trimethoxysilyl)benzyl]-3-[2,4-(di-i-propyl)phenyl]imidazolin-2-  
 ylidene}[P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(triethoxysilyl)benzyl]-3-[2,4-(di-i-propyl)phenyl]imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(trimethoxysilyl)-2,4-(dimethyl)phenyl]-3-(mesityl)imidazolin-2-  
 ylidene}[P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 30 {1-[4-(triethoxysilyl)-2,4-(dimethyl)phenyl]-3-(mesityl)imidazolin-2-ylidene}-  
 [P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 {1-[4-(trimethoxysilyl)-2,4-(dimethyl)phenyl]-3-(cyclohexyl)imidazolin-2-  
 ylidene}[P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh  
 35 {1-[4-(triethoxysilyl)-2,4-(dimethyl)phenyl]-3-(cyclohexyl)imidazolin-2-  
 ylidene}[P(Cy)<sub>3</sub>]Cl<sub>2</sub>Ru=CHPh.

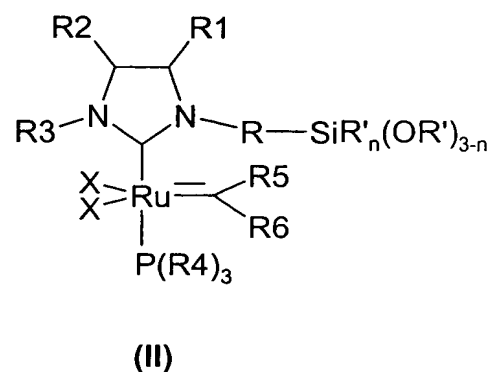
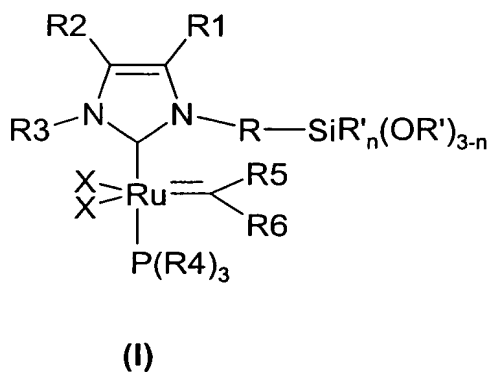
8. Process for the preparation of compounds of the general formulae (I) and (II), characterised in that an alkoxysilyl-functionalised imidazolium salt of the general formula (III)



or an alkoxysilyl-functionalised 4,5-dihydroimidazolium salt of the general formula (IV)

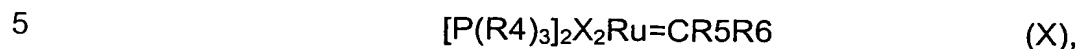


in which R, R', R1, R2 and R3 may adopt the meanings given in the preceding claims, and X<sup>-</sup> can be an anion from the group consisting of F<sup>-</sup>, Cl<sup>-</sup>, Br<sup>-</sup> and I<sup>-</sup>, is either converted directly into a compound of the general formula (I) or (II) respectively



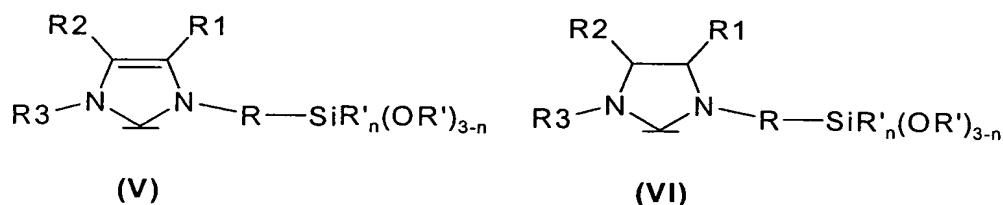
by reacting the compounds of the general formula (III) or (IV) with a base

capable of deprotonation selected from the group consisting of the metal alkoxides (MOR), metal hydrides (MH), metal amides (MNH<sub>2</sub>) and/or ammonia in the presence of a compound of the general formula (X)



in which R<sub>4</sub>, R<sub>5</sub>, R<sub>6</sub> and X are as in Claim 1,  
in an anhydrous, inert, aprotic, organic solvent,  
or

10 in that the compounds of the general formula (III) or (IV), if necessary after prior purification, are reacted with a base selected from the group consisting of the metal alkoxides (MOR), metal hydrides (MH), metal amides (MNH<sub>2</sub>) and/or ammonia in an anhydrous, inert, aprotic, organic solvent to give carbenes of the general formula (V) or (VI) respectively



and are subsequently reacted with compounds of the general formula (X)



in an anhydrous, inert, aprotic, organic solvent under a protective-gas atmosphere to give compounds of the general formula (I) or (II) respectively.

30 9. Process according to Claim 8, characterised in that the compound of the general formula (III) or (IV), the base employed and the ruthenium compound of the general formula (X) are employed in a stoichiometric ratio in the range from 1:1:1 to 1:1.5:1.5, where the ratio of the base employed to the ruthenium compound is independent of one another.

35 10. Process according to Claim 8, characterised in that KO<sup>t</sup>butoxide or KH is employed as base.

11. Process according to Claims 8 to 10, characterised in that the solvents used are hydrocarbons or ethers.
12. Process according to Claims 8 to 10, characterised in that, for the reaction of the compound of the general formula (III) or (IV) with a ruthenium compound of the general formula (X) in the presence of a base, a solvent selected from the group consisting of pentane, hexane, heptane, octane, decane, benzene, toluene and tetrahydrofuran or mixtures thereof is used.
13. Process according to Claims 8 – 12, characterised in that the reaction of the compound of the general formula (III) or (IV) with a ruthenium compound of the general formula (X) is carried out over the course of from 30 minutes to two days at a temperature in the range from -78 to +150°C, where the protective gas used is nitrogen or argon.
14. Process according to Claim 8, characterised in that the reaction of the compound of the general formula (V) or (VI) with a ruthenium compound of the general formula (X) is carried out in a solvent selected from the group consisting of pentane, hexane, heptane, octane, decane, benzene, toluene and tetrahydrofuran.
15. Process according to Claim 8, characterised in that the reaction of carbene of the general formula (V) or (VI) with a ruthenium compound of the general formula (X) is carried out in a stoichiometric ratio of between 1:1 and 1:1.5.
16. Process according to one or more of Claims 8, 14 and 15, characterised in that the reaction is carried out over the course of from 30 minutes to two days at a temperature in the range from -78 to +100°C.
17. Use of the compounds of the general formulae (I) and (II) as catalysts in organic and organometallic synthesis.

18. Use of the compounds of the general formulae (I) and (II) as starting materials for the preparation of immobilised catalysts for organic and organometallic syntheses.
- 5 19. Use of the compounds of the general formulae (I) and (II) as catalysts in C-C coupling reactions, hydrogenations, isomerisations, silylations and hydroformylations.
- 10 20. Use of the compounds of the general formulae (I) and (II) as catalysts in olefin metathesis reactions, such as cross metathesis (CM), ring closure metathesis (RCM), ring opening metathesis polymerisation (ROMP), acyclic diene metathesis polymerisation (ADMET) and ene-yne metathesis.
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